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Soil Physics Laboratory, Department of Soil and Environment; SLU

Highlights

The Soil physics laboratory is a routine laboratory providing soil physics analyses to support research and environmental monitoring at SLU and external customers.

In 2023, the highlights included:

- At the beginning of the year all measurements was stopped and the lab was closed. During the summer a new laboratory technician, Anna Eklöv Pettersson, was employed. October first the lab reopened for customers to send in samples. It has since then been operating similar to previous years.
- In October a comparison study of texture analyses using PARIO was started up together with NIBIO and NMBU in Ås, Norway. Attila Nemes and Maria visited the Soil Physics Laboratory at SLU the 30th of October to 3 of November. Two weeks later, Anna Eklöv Pettersson visited the soil laboratory at NIBIO. The study aims to compare the pre-treatment methods of the soil in order to understand how and if the two different protocols may affect the result of the analyses. The two labs are working with the same 26 soils form both Sweden and Norway. The study is to be completed in 2024.

1. Activities

The Soil Physics Laboratory received many samples at the end of the previous years (2021 and 2022 and beginning of 2023). There was no time to analyze these samples during 2021 and 2022 so there were analyses left at the beginning of 2023. The lab closing meant that analyses were put on hold until the reopening in October 2023. However the lab managed and the same amount of samples has been received during 2023 as during 2022, see Table 1 for calendar year 2017-2023.

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Analysis	2017	2018	2019	2020	2021	2022	2023
pF	850 cylinders	725 cylinders	493 cylinders	482 cylinders	518 cylinders	455 cylinders	588 cylinders
Texture (pipette method)	577 samples	730 samples	631 samples	332 samples	300 samples	69 samples	33 samples
Sat Hyd Cond	565 cylinders	463 cylinders	304 cylinders	397 cylinders	428 cylinder	345 cylinders	252 cylinders
Water content or Dry bulk density	141 cylinders	549 cylinders	57 cylinders	227 cylinders	84 cylinders	41 cylinders	18 cylinders
EC + pH	138 samples	111 samples	14 samples		5 samples		
Wilting point	99 samples	84 samples	57 samples	40 samples	163 samples	29 samples	18 samples
Loss on ignition	129 samples	39 samples		54 samples	84 samples	8 samples	11 samples
Particle density	73 samples	30 samples	18 samples	26 samples	170 samples	43 samples	28 samples
Texture (laser)	69 samples	44 samples	14 samples	215 samples	140 samples	25 samples	249 samples
Gravimetric water content	120 samples	120 samples	2 samples	15 samples	15 samples		8 samples
Texture in water samples or dust (laser)	12 samples		81 samples		1 sample		
Texture (PARIO)				84 samples		4 samples	43 samples

Table 1: Received samples per analyses at Soil Physics Lab Department of Soil and Environment SLU, 2017-2023.

2. Maintenance

In the end of August the common freezer room in the lab corridor broke and all the samples had to be evacuated and moved to a temporary freezer container until the freezer room was fixed. During the beginning of autumn a fungi infection was noted in the common cold room due to high humidity and temperature in the room. Sanitation took place in December. Due to these two events new routines was taken up regarding how to mark and store incoming samples.

At the end of September the pressure relief valve on pressure chamber number 7 had to be changed. When this took place an extra pressure valve was installed at the inlet to the lab. This to be able to control the central pressure system inlet more. Before the 20 bar central system was going directly to the individual pressure plate valves. When testing the new system the pressure was unstable and it was only possible to run one of the high pressure (15 bar) plates at the time, doubling the time of the wilting point analyses.

3. Staff (inc. health and safety, training)

At the beginning of the year the regular lab technician Ana María Mingot Soriano could not work with soil for personal reasons. Several staff assisted helping with various tasks to finish the samples that had been started. From March until June the measurements were completely stopped in the laboratory. In June the new technician, Anna Eklöv Pettersson, started to work in the laboratory. During June

and July, there was a handover between technicians. From August, Anna took over all the responsibilities of the Soil Physics Laboratory.

4. Communication, publication

- Guillaume, Benjamin; Boukbida, Hanane Aroui; Bakker, Gerben; Bieganowski, Andrzej; Brostaux, Yves; Cornelis, Wim; Durner, Wolfgang; Hartmann, Christian; Iversen, Bo V.; Javaux, Mathieu; Ingwersen, Joachim; Lamorski, Krzysztof; Lamparter, Axel; Mako, Andras; ***Soriano, Ana Maria Mingot; Messing, Ingmar;*** Nemes, Attila; Pomes-Bordedebat, Alexandre; van der Ploeg, Martine; Weber, Tobias Karl David; 2023. Reproducibility of the wet part of the soil water retention curve: a European interlaboratory comparison. SOIL volume 99, no 1 365-379 DOI: https://doi.org/10.5194/soil-9-365-2023

Website:https://www.slu.se/en/departments/soilenvironment/laboratories/the-soil-physics-laboratory2/

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